Attorney Docket No. 08258.P008C *PATENT*

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	
PERLMAN, STEPHEN G.	Examiner: Mills, Donald L.
Serial No.: 10/619,919	Art Unit: 2416
Filing Date: July 15, 2003	Confirmation No.: 7151
For: **METHOD OF OPERATION FOR A THREE-DIMENSIONAL, WIRELESS NETWORK**	

Declaration Under 37 C.F.R. § 1.132

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Stephen G. Perlman, declare that:

1. I received a Bachelor of Arts Degree from Columbia University in 1983. As an engineer and a pioneering innovator in the entertainment, multimedia, computer, communications, and consumer electronics technological fields I am completely self-taught. I received a ham radio license in junior high school; built my first computer at age 16; designed and built my own color graphics display at age 17; and designed and built a novel software-based state-of-the-art 1200 bps modem in 1980 at age 19, which cost only $25 to build, at a time when commercially-available 1200bps modems were hardware-based and sold for over $1000.

2. In 1985 I joined Apple Computer, Inc. where I became a Principal

Scientist. My team was responsible for the development of the underlying multimedia (color graphics, sound, 3D, animation, displays, and video) technology incorporated into the color Macintosh computer, including the underpinnings of the present-day QuickTime® technology. To this day, all Macintosh computers, iPhones and video iPods are still utilizing these technologies, and QuickTime is used in a large percentage of PCs as well. After several years, I left Apple to work as Managing Director of Advanced Products for General Magic developing a software modem technology, later acquired by Broadcom, and system-on-a-chip with an embedded MIPs CPU modified with DSP capability that was manufactured by Sony, IDT and Philips and became the core silicon for the first WinCE PDAs; then later, in 1994, I co-founded Catapult Entertainment. As Catapult's Chief Technology Officer I was responsible for the design and development of proprietary modems for Sega and Nintendo video game systems that online-enabled existing multi-player games.

3. In 1995 I co-founded WebTV Networks, Inc., not only conceiving of the product and designing its hardware (including architecting the central VLSI chips) and software, but acting as its President and Chief Executive Officer. While at WebTV, I created and introduced the first mass-market Internet-based consumer product: the WebTV® Internet Terminal. WebTV was a revolutionary product that combined Internet TV, and in later versions, interactive TV, digital TV, a Digital Video Recorder (DVR), and games into an integrated, simple and inexpensive consumer electronics device. A significant percentage of the hardware, software, signal processing and image processing technology was architected and designed by me personally. Twenty months after it was founded, WebTV was acquired by Microsoft Corporation for over $500 million. After the acquisition I became President of Microsoft's WebTV Division, in charge of over 700 employees internationally, developing virtually all of Microsoft's TV-related products at the

time, including their digital satellite and digital cable TV products. Over 3 million WebTV products have been sold throughout the world, and have been deployed to both DirecTV® and Dish Network® satellite customers. WebTV introduced the first DVR (three months before TiVo or ReplayTV), the first DVR for satellite TV (more than a year and more than 200,000 units before any other product was introduced), and the first DVR with two functional tuners, all based on my technology. WebTV (now sold as MSNTV) has also been quite financially successful, all based on the core software, hardware and network architecture I designed. Unlike almost all online services introduced in the dot-com era, WebTV was profitable 18 months after launch and has remained profitable every quarter since then to this day. It has produced over $1.3 billion in revenue for Microsoft. And even in 2005, ten years after founding, the base WebTV internet TV product still grossed $150 million with 65% gross margin. Furthermore, Microsoft has accrued far more value beyond this, due to the video, satellite, cable, internet media, internet protocol television, voice of internet protocol, and video game hardware technology that has grown out of the original WebTV technology.

4. I left Microsoft in 1999 to start Rearden LLC (www.rearden.com), a family of companies dedicated to the synergistic creation of art and technology. My present title is Founder and CEO of Rearden, Inc. In 2000, Rearden spun off Moxi Digital, Inc. (www.moxi.com), a company focused on revolutionizing home entertainment. At its inception, Moxi received approximately $67 million in Series 'A' funding, which remains one of the largest first-round funding dollar amounts in U.S. history for a technology start-up company. In January 2002 Moxi introduced the Moxi Media Center, a product that I created as a low-cost digital cable or satellite set-top box (STB) that integrated Digital Video Recording, Music Jukebox, DVD player, and Internet Gateway into one device that wirelessly networked video, audio, and broadband connectivity throughout the home. The Moxi Media Center

was so well received in the industry that it was awarded "Best of Show" across all categories at the 2002 Consumer Electronics Show. In May of 2002 Moxi merged with Microsoft co-founder Paul Allen's Digeo, Inc. Over 400,000 Moxi set-top boxes have been deployed by Comcast Corporation, Charter Communications, Adelphia Communications Corporation, and various other cable TV network operators.

5. Since 2002, I have founded and operated five media production and online distribution companies, all utilizing technology I have designed (OnLive, Inc. (www.onlive.com), Ice Blink Studios LLC (www.iceblink.com), MOVA LLC (www.mova.com), Rearden Studios LLC (www.reardenstudios.com), and Women of Action Media, LLC (www.woa.tv)), and I have been leading the development of advanced technologies in the areas of wireless communications, wireless power transmission, digital lenses, performance motion capture, alternative energy vehicles, and display technology, among others. I am Founder, President and CEO of OnLive, Inc., spun out from Rearden LLC in 2007, which offers video game and application on-demand services through the Internet by means of remotely hosted high-performance servers connected to homes and businesses via a proprietary low-latency video compression technology . I am Founder and President of MOVA LLC, which offers proprietary facial motion capture technology, which has been used in motion pictures such as *The Curious Case of Benjamin Button*, which won the 2008 Academy Award® for Achievement in Visual Effects for computer-generated facial aging effects. Also, I continue to consult for major corporations developing consumer electronic products as well as advise key individuals in these industries as well as in industries providing broadband media delivery, so I am very aware of the historical developments, trends and challenges that these industries have faced, as well as the present-day technological challenges.

6. During my 33-year career as an engineer and researcher I have worked with and managed hundreds of engineers, scientists, and researchers in the related fields of computers, communications (wired and wireless), entertainment, optics, and multimedia electronics technology. I am currently named as an inventor on 81 granted U.S. patents. Products based upon these patents have produced billions of dollars in revenue. Additionally, I have designed mass-market consumer products as work for hire, or under license to me that have been sold by Apple, Microsoft, RCA, Motorola, Sony, Philips, Samsung, Panasonic, Fujitsu, Mitsubishi, Sega, Scientific Atlanta and EchoStar under their brands. These products have had to meet stringent technical and usability standards as well as extensive government and non-government agency approvals, such as those required by the FCC. Furthermore, since my work often involves pioneering new product categories, I have actively been involved in establishing US technology-related policy. For example, WebTV utilized strong encryption to prevent hacker attacks. When it was introduced, it was illegal to ship strong encryption outside of the US. Through extensive meetings with U.S. Senators, U.S. Representatives, the NSA, CIA, FBI, President Clinton and Vice President Gore and their staffs, I was successful in getting an exception to allow WebTV to be exported to Japan and the UK with strong encryption, and eventually was able to get that legislation changed to apply to all US products.

7. As a result of my extensive professional experience, I am very familiar with the skill of an ordinary practitioner working in the fields, among others, of satellite communications, wireless communications, wireless networking, video products, computer, and media-rich consumer electronic products as well, prior to 2003. I am also familiar with the skills of ordinary practitioners and the state-of-the-art in these related fields extending across the time period from 2003 to the present.

8. I am the inventor of the subject matter of the above-captioned patent application. I am familiar with the subject matter of that application and the invention defined by pending claims, as currently amended by the Amendment and Response submitted herewith. I have also read and am familiar with the prior art references most recently cited in the above-captioned patent application, including U.S. Patent No. 6,584,080 of Ganz et al. (hereinafter "Ganz"); U.S. Patent No. 6,690,657 of Lau et al. (hereinafter "Lau"); U.S. Patent No. 6,115,369 of Oura (hereafter "Oura"); and U.S. Patent No. 6,968,153 of Heinonen et al. (hereafter "Heinonen").

9. I have also read the Final Office Action dated January 06, 2009 for the above-captioned patent application and understand that claims 28-30 and 33-36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ganz in view of Oura, and Ganz in view of Heinonen. Additionally, I understand that claims 31-32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ganz in view of Heinonen and further in view of Lau.

10. Ever since I began working on consumer electronic devices in the multimedia, communications, and entertainment industries more than 33 years ago there has existed a pressing need for a method for high-speed wireless transmission of data packets over a network without the requirements of a complex (and potentially unsightly) installation, or the limitation of having the media receiver (e.g. a television) at some fixed location where a wired connection has been installed. The advent of multi-channel television through cable TV and satellite TV services has dramatically increased the choices, features and image quality available to television viewers beyond what was available through over-the-air (OTA) terrestrial television service. Not surprisingly, cable TV and satellite TV services have come to dominate the television market, providing television service to the vast majority of US households and businesses with televisions. In almost

every respect, cable TV and satellite TV service offers an improvement to consumers, but there is one significant disadvantage: the simplicity of installation, and in particular, the ability to locate the television receiver wherever it is convenient. Both cable TV and satellite TV services are typically installed by a professional installer. An appointment has to be made and usually the consumer needs to be home when the installation is done, and often it is not possible to schedule an appointment at a specific time or a convenient time, so the consumer may end up waiting around for many hours and may have to miss work or other obligations. Then, since the installation involves thick coaxial cables that need to be snaked through walls, this often involves drilling, cutting holes in walls, and/or tacking unsightly cables onto exterior and interior walls.

11. Traditional wireless networks have worked fairly well for residential Internet traffic running at data rates below 1 megabit per second (Mbps). Audio-only transmissions for mobile telephone (cellular) networks also work well at data rates of several hundred kilobits per second (Kbps). But transmission of high-bandwidth video programs is more problematic due to the much faster video data rates. As explained in the Background section of my patent application, high-bandwidth data transmissions can be degraded by the presence of structural obstacles (e.g., walls, floors, concrete, multiple stories, etc.), large appliances (e.g., refrigerator, oven, furnace, etc.), human traffic, conflicting devices (e.g., wireless phones, microwave ovens, neighboring networks, X10 cameras, etc.), as well as by the physical distance between the access point and the mobile terminal or other device. By way of example, an IEEE 802.11b compliant wireless transceiver may have a specified data rate of 11.0 megabits per second (Mbps), but the presence of walls in the transmission path can cause the effective data rate to drop to about 1.0Mbps or less. Degradation of the video signal can also lead to repeated transmission re-tries, causing the video image to appear choppy. These practical limitations make

present-day wireless technologies one of the most unreliable of all the networking options available for home media networks. There remains a substantial commercial need for a wireless repeating system that is reliable, robust (e.g. able to deal with interfering sources) and works within existing standard protocols and channel allocations.

12. The consequences of applying conventional methods of using wireless for video are quite apparent to anyone living in a multi-dwelling unit (MDU) or office building where there are many users trying to use Wi-Fi access points simultaneously (as well as other devices, e.g. cordless phones, Bluetooth devices), all competing for the same spectrum: the connection is spotty and unreliable, particularly when users are downloading high-bandwidth data like video. The difficulties of using Wi-Fi in a multiple-user office environment were recently documented in an article entitled "Helpless, Hopeless, Wireless" published in the *Wall Street Journal* on June 26, 2007 (http://online.wsj.com/article/SB118282236794247982-search.html?KEYWORDS=wi-fi&COLLECTION=wsjie/6month). This article (a copy of which is attached as Exhibit 1) reports that the problems associated with wireless distribution of video and other media to users and customers have been so severe that the wireless market growth has slowed, despite the convenience of using wireless instead of wired connections. To quote the author (on page 3):

> Wi-Fi in offices may face further bumps, especially with the growth of new technology like online video. Since video traffic is bulkier than traditional text traffic, watching video over a wireless network can slow access speeds to a crawl and bump users off the network.

13. This *WSJ* article clearly shows that while persons of ordinary skill have been working on the problem of wireless distribution of video to remote viewers for many years, they still have failed to arrive at a practical solution. In other words, despite a long-felt need in the marketplace, others have been unable to solve the problem that I have solved with my claimed invention. This article should therefore

be considered as objective evidence that the subject matter of my claims would not have been of obvious to an ordinary practitioner working at the time of my invention. This article also shows that a person of ordinary skill would recognize that there is no straightforward path or obvious approach to take in any attempt to extend distribution of real-time audiovisual content over a wireless network.

14. The claimed subject matter of the above-referenced patent application addresses the strong need for a highly reliable wireless network (e.g., on a par with coaxial cable) that provides very high data rates (e.g., 30 Mbps) throughout the full coverage range of a home or building, and in certain embodiments, even extending well beyond the premises to reach users located an arbitrary distance away. The method of my claimed invention comprising adapting a wireless local area network (WLAN) to a channel by re-configuring a repeater in a branch of a wireless repeater topology to re-use a certain channel already in use by a neighboring repeater permits video programs to be wirelessly transmitted to a user through walls, around corners, etc., using existing protocol channel allocations (i.e., no guard bands are required), and all channels that are available can be used (i.e. there is no restriction on channel adjacency). Effectively, my claimed invention accomplishes in a practical world everything that Lau hopes to approach in an ideal world with 100% throughput and no pipeline. I explain why this is so in the paragraphs below.

15. Based on my knowledge of experience in the industry, a person of ordinary skill in the art in February 2003 – that is, someone with an engineering degree and 1-2 years experience in the field of multimedia communications – would have understood that Ganz teaches a conventional radio communication repeater system in which each repeater is strictly limited to line-of-sight (LOS) data transmissions with another repeater. Such a person would also have understood that Ganz does not teach data transmissions to a next repeater that is physically

obstructed from a LOS view, and that Ganz' system would be unable to transmit data at a throughput of 11Mbps or greater across a wireless network having a non-LOS repeater topology. It is well-known in the art that LOS transmissions can only be achieved in specialized installations under particular circumstances, where the path is not only completely clear between transmitter to receiver, but must remain completely clear after the installation. Such installations are typically made by professional installers and maintained by companies that can eliminate any obstruction that may later appear in the transmission path. A repeater system based upon LOS links typically cannot reconfigure itself in the event of a disruption to the repeating chain. Typically, a human professional installer must be called in to correct the problem. Further, LOS transmissions are a very special case of wireless transmission because focused beams can eliminate channel conflict between two transmitters that are within range of each other (e.g. the same channel can be used for two focused beams that cross each other in space that are targeted for two different receivers). Indeed, a key reason LOS transmissions are used is to avoid channel conflict issues for example, in LOS wireless rooftop point-to-point systems in cities where the same channel is used by multiple LOS transmitters crossing each other in space. For these reasons, a person of ordinary skill in the art back in 2003 would not have considered Ganz relevant to the problem of re-configuring wireless repeaters to overcome frequency channel conflict in a network that provides data throughput at a rate of at least 11Mbps (e.g., real-time video).

16. Similarly, a person of ordinary skill in 2003 would not have understood Oura as being relevant to real-time multimedia communications (i.e., audiovisual) at a high data throughput because his methods are applicable only to mobile phone communication systems which have significantly lower data throughput rates (e.g., < 1 Mbps). That is also why a person of ordinary skill in the art would

not consider combining Ganz with Oura, or Ganz with either Heinonen or Lau to solve the problem of how to achieve a wireless network utilizing repeaters operating at a high data throughput (at least 11Mbps) while transmitting through walls. Oura teaches a Time Division Multiple Access-Time Division Duplex (TDMA-TDD) communication method for transmitting and receiving between base stations and mobile phone stations. TDMA is a technology for delivering digital wireless service using time-division multiplexing (TDM). TDMA is a conventional audio communication technique that works by dividing a radio frequency into time slots and then allocating slots to multiple calls. In this way, a single frequency can support multiple, simultaneous data channels. Oura utilizes TDMA-TDD technology in a cellular phone network to allow a number of different users to receive forward channel signals and then, in turn, transmit reverse channel signals using the same carrier frequency.

17. In my opinion, an ordinary practitioner would certainly have lacked any reasonable expectation of success at achieving my claimed invention based on any combination of Oura with Ganz, or Ganz with Heinonen because each of these references is limited to very slow data throughputs – at least an order of magnitude less than that defined by the claimed invention. In addition, a person of ordinary skill in the art would have understood that the CSMA/CA and TDMA techniques taught by Oura suffer the disadvantage of a throughput limitation of about 1 Mbps, with a range limitation of less than typical household dimension, bandwidth inadequate for multimedia, limitations in the number of active devices, and wasted bandwidth. Indeed, Lau disparages TDM approaches such as Oura's as being inadequate due to these very limitations (see column 2, line 25 through column 3 line 29). Lau teaches away systems that utilize CSMA/CA techniques as well as TDMA services, wherein one transceiver communicates with another transceiver on a channel only when the channel is not already in use. A person of

ordinary skill would understand that Oura discloses a data transmission speed of 384 kbps, a rate that is far too slow for reliable real-time transmission of audiovisual content.

18. Heinonen is similar to Oura in that he teaches transmission of data at low data rates. Heinonen teaches a Bluetooth repeater that may receive Bluetooth communications from an originating Bluetooth enabled device within range and then forward the same data to an intended recipient outside the range of the originating Bluetooth enabled device. At the time of my invention, a person of skill in the art would have understood that Bluetooth is a radio frequency (RF) technology with a very short effective range (e.g., 10 meters), with Bluetooth data transfers being limited to a rate of about 1 Mbps, which is far less than what is required for high-quality, high-bandwidth video transmissions. Such a person would have also understood that Bluetooth technologies are incapable of achieving data transfer rates of at least 11Mbps. Because of the enormous difference in throughput rates (and associated problems) between transmitting audio versus real-time audiovisual data, a person of ordinary skill in the art in 2003 would have dismissed Heinonen as irrelevant to the problem of wireless transmission and re-transmission of data at rates of 11Mbps or greater. Such an ordinary practitioner would therefore have had no reasonable expectation of success in any attempt to combine Heinonen with Ganz and/or Lau to try to arrive at my claimed invention.

19. Based on my considerable experience, it is also my opinion that an ordinary practitioner would not have considered Heinonen as teaching how to use 802.11a, b or g technologies to implement a wireless network with repeaters capable of transmitting data packets at rates of 11Mbps or greater. Heinonen only mentions 802.11 in a single sentence at column 4, lines 10-15, which reads, preceded by two contextual sentences: "Each pair is comprised of two Bluetooth

chips C1 and C2. In one embodiment, the repeater pairs 193, 193b block out all communications other than transmissions coming from the other pair. In an alternative embodiment, a portion of each repeater pair is replaced with another communications link such as, but not limited to: Bluetooth with directed antenna; cellular; IEEE 802.11a, b and g; physical links (i.e., Ethernet, twisted pair wiring, CAT 5 cabling, etc.); and/or the like." To a person of ordinary skill in the communication arts, such a configuration would limit the transmitted data rate to the data rate of the slowest link in any repeater pair. Since each repeater pair explicitly includes at least one Bluetooth chip C1 or C2, that limits the data rate of any configuration to the 1Mbps data rate of Bluetooth. This teaches away from any configuration that would support high data rate transmissions (e.g., 11Mbps) over a wireless network that includes a plurality of access points disposed about a building.

20. It is my further opinion that Heinonen would have dismissed by a person of ordinary skill as largely irrelevant to a method that includes re-configuring a wireless repeater of a wireless network to re-use a certain channel already in use by a neighboring repeater, and to transmit data at a data throughput of at least 11Mbps on the certain channel during even time intervals and receive data at the data throughput on the certain channel during odd time intervals. Such a person would certainly have had no reasonable expectation of success at achieving my claimed invention in view of any combination of the teachings of the Ganz, Oura, Heinonen, and/or Lau references.

21. Heinonen also fails to teach any protocol or scheme for avoiding frequency interference so as to not compromise data throughput through the network. Rather, Heinonen's purpose is to extend the range of Bluetooth devices by use of standard repeaters, without any concern to the impact this extension of

range would have on data throughput. Given that Bluetooth was designed for low-bandwidth devices (e.g., input peripherals and audio devices) this is a reasonable trade-off since maximizing throughput is rarely a concern for Bluetooth applications. But Heinonen's approach would necessarily defeat the throughput data rate of a wireless repeater network that is attempting to approach the maximum throughput that is available in the wireless spectrum.

22. A person of ordinary skill in the art would also understand that Lau teaches a largely theoretical approach based on ideal arrangement of elements that is rarely achievable in the real world. To begin with, such a skilled practitioner would recognize that the multiple transmitters and receivers referred to in Lau are source and destination devices. This is made clear in column 5, lines 11-15, wherein he states, "T/R" devices in all of the diagrams are intended to each connect to a digital device and have a single transceiver (and they have a single antenna in the diagrams for this reason), since they are either transmitting or receiving at a given time. The repeaters, on the other hand, are receiving and transmitting constantly. This is apparent since in the figures each repeater is shown to have two antennas, meaning it has two independent RF subsystems, each for handling communications on a different frequency. Lau also makes it quite clear that the repeaters are receiving and transmitting *simultaneously*. For example, in column 6, line 25 Lau explicitly acknowledges that it may be necessary to re-use channels and there is the risk of feedback. The reason there is the risk of feedback is because Lau is receiving and transmitting simultaneously (i.e., the same effect one hears when a public address system microphone is placed in front of its speaker: since the audio signal – or RF signal in Lau's case – is being transmitted at the same frequency at the same time it is received, the repeated transmission is picked up again by the receiver and retransmitted again, getting louder and louder, in an unending loop).

23. Lau teaches are a variety of ways to establish a repeater network for which there is no compromise in network throughput. Lau lists a litany of arrangements that could be used if, in fact, an arrangement of non-interfering frequencies (or orthogonal codings, as in the case of TDMA) can be found, so that, by changing frequencies or controlling power, it is the case that the repeaters can repeat whatever the base station sends with either no interference or infrequent interference (which, in the event it occurs, would require a retransmission of data). But a person of ordinary skill would have understood that such ideal environmental arrangements are rarely available. Lau acknowledges that when simultaneously transmitting and receiving on adjacent frequencies there is a problem with a transmitter saturating a nearby receiver. (See Figure 9 and Col. 6 starting on line 53) For example, on line 58 Lau states, "The guard band allows a repeater (or T/R module) to transmit on one channel without saturating the receiver amplifier operating on the other channel, thus enabling simultaneous reception and transmission." Lau's implicit assumption in establishing guard bands is that the repeaters and T/R frequencies can be selected arbitrarily so that the guard bands can use as little spectrum as possible (e.g., Fig 9 shows a guard band that is much narrower than the spectrum for either CH1 or CH2) . Persons of skill reading Lau would understand that such flexibility is rarely the case, either in unlicensed ISM spectrum or in licensed cellular spectrum because to be compatible with existing 802.11x devices or existing cell phones, the current channel allocations must be utilized, and they generally are not allocated with guard bands. Thus, with 802.11, it would be necessary to waste an entire channel between two utilized channels, just to establish a guard band. In the 2.4 GHz band, there are only three WiFi channels, so that means using Lau this would be reduced to two WiFi channels, because the center channel required as a guard band. So, for Lau to be used at all with 2.4 GHz WiFi (which is 99% of the market for PC wireless LANs) both the 1st

and 3rd channels must be free from use by any other 2.4GHz wireless device, or Lau's entire teachings are unusable. In the 5.8GHz band there are more channels and (thus far) less public utilization, but if 1/2 of them were discarded to accommodate Lau's adjacent channel interference problem, it would be a 50% waste of spectrum.

24. Lau recognizes that such guard bands waste spectrum, but he simply sidesteps the problem and says in the next paragraph that "As more channels are added, it may be possible to decrease of eliminate the guard bands" and then describes a complex scheme that not only involves the aforementioned complexity of making sure no channel within range of another interferes very frequently with another, but adds the additional extreme complexity of having to guarantee separation between adjacent channels to avoid adjacent channel interference. For example, at column 7, lines 12-14 he says, "The pairings selected for receive and transmit channels provides the separation necessary to provide substantial non-interference." However, if Lau's teachings were used in virgin licensed spectrum and had no compatibility requirements and was not subject to any existing interference sources, such an arrangement might be conceivable. But an ordinary practitioner would have understood that back in 2003 that such arrangements are very unlikely, making Lau's scheme highly impractical.

25. An ordinary practitioner reading Lau back in 2003 would have further understood that by teaching a system that uses repeaters having transceivers that transmit and receive simultaneously on different frequency channels Lau teaches away from my claimed invention. A skilled artisan reading Lau would therefore have also been dissuaded from attempting a method for a wireless network comprising adapting a wireless local area network by re-configuring a repeater to re-use a certain channel already in use by a neighboring repeater in the repeater topology, the first repeater and the neighboring repeater being physically

obstructed from a line-of-sight view, the first repeater being re-configured to transmit data at a throughput of at least 11Mbps on the certain channel during even time intervals and receive data at the data throughput on the certain channel during odd time intervals, the neighboring repeater transmitting during the odd time intervals and receiving during the even time intervals.

26. Thus, it is my opinion that back in 2003 an ordinary practitioner would not have had a reasonable expectation of success in combining the references in the manner suggested by the examiner in the Office Action dated January 06, 2009. For all of the reasons given above, it would have been well beyond the skill of an ordinary practitioner at the time of my invention to depart from Ganz' teachings and devise a method for configuring a wireless network for wireless transmission of data at a high data throughput utilizing a wireless repeaters that receive and re-transmit in alternate intervals as defined by my claimed invention. It would also have been beyond the skill of an ordinary artisan to modify or combine Ganz with Oura, or Ganz with Heinonen, or Ganz with Heinonen and further in view of Lau, in an attempt to arrive at my claimed subject matter. The Oura and Heinonen references are all limited to very slow data throughputs that is impractical for real-time video media. Furthermore, Lau disparages the TDM approaches such as that utilized by Oura for mobile phone communications as being unusable for multimedia communications.

27. I declare, to the best of my knowledge, that all statements made in this document are true, and that all statements made on information and belief are believed to be true; and further, that these statements are made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of above-captioned application or any patent issued thereon.

Date: 7/6, 2009

Stephen G. Perlman

Business Technology

Helpless, Hopeless, Wireless

Companies Cool on Hot Spots As Wi-Fi Connection Problems Lead to Help-Desk Headaches

By BOBBY WHITE
June 26, 2007; Page B1

When William Friemann joined real-estate firm Prudential Fox & Roach last year as its vice president of technology operations, he was alarmed at how much it was costing his information-technology department to continuously troubleshoot the company's patchwork wireless network.

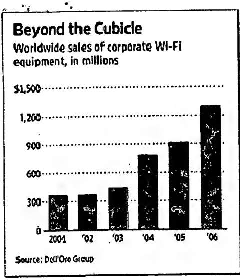
The network, which uses a wireless technology known as Wi-Fi, kicked people off if they moved away from the immediate area around a wireless access point (the antenna that receives signals from a wireless device). When employees tried to connect to the office network through a Wi-Fi connection at home, some users got bounced off the system without warning, while others were unable to make a remote connection. As a member of the help desk, Mr. Friemann often spent hours trying to solve employees' problems with the system.

Things got so bad that Mr. Friemann sometimes had employees piggyback on a neighboring business's wireless connection that was more stable -- without the other business's consent or knowledge. "It was almost like if you wanted to have remote access, you'd better expect to not have a good experience," says Mr. Friemann, 38 years old, who is based in Cherry Hill, N.J.

Wi-Fi was supposed to reduce complications, not create new ones. The wireless technology was designed to eliminate the cords and cables used to connect computers to the Internet, enabling users to be more mobile and to stay connected to the office even while on the go. Since debuting in the 1990s, the technology has been widely embraced by consumers. Wireless hot spots can now be found at many airports, hotels and **Starbucks** Corp. coffee shops.

But in many offices, Wi-Fi has been a headache. Like all radio signals, Wi-Fi is subject to interference. Its relatively low power -- less than even a typical cellphone -- means walls and cabinets can significantly reduce signal strength. Wi-Fi also creates a more open network than wired networks, raising security issues.

And Wi-Fi has caused problems for virtual private networks, or VPNs, which are lines of private communication through the public Internet created with encryption software. Some VPNs, which give users access to corporate networks from home or on the road, require a lot of processing power. If a wireless access point -- at home, at the office or on the road -- isn't robust enough, a user often gets bumped off the connection.



Wi-Fi issues have placed a great deal of stress on many corporate IT departments in part because such problems extend beyond the walls of the workplace. Many IT workers are finding that in addition to troubleshooting Wi-Fi problems at the office, they're also called upon to help when colleagues have trouble connecting to their corporate network using Wi-Fi at home, at a hotel or at a remote conference room.

All of this has stunted the growth of Wi-Fi in offices, according to research firm Dell'Oro Group. Some business users have turned away from Wi-Fi entirely. Total corporate spending on Wi-Fi equipment is still relatively small, though it's growing -- last year, companies spent $1.3 billion on Wi-Fi equipment, up from $917 million in 2005, according to Dell'Oro. In contrast, companies last year spent $16 billion on equipment that would allow them to access wired corporate networks. "Clearly there's room for growth, but there are still problems with Wi-Fi that make companies uncomfortable," says Elmer Choy, a senior analyst at Dell'Oro.

The difficulties employees have with Wi-Fi at home are often different from the troubles they face at the office. With home users, problems often occur between the configuration of their home connection and the software they have installed to access the corporate network. Sometimes the VPN software isn't compatible with the home network. At work, the main issue is often security, and how to prevent hackers and others from gaining access to the system.

Some wireless networking companies are taking steps to try to deal with customers' problems. One major issue is the stability of the wireless signal. Ruckus Wireless Inc., a wireless networking company based in Sunnyvale, Calif., tries to address that problem by providing wireless access points that have multiple antennas. That allows a Wi-Fi signal to have more than one pathway to an access point -- which can come in handy if something is in the way.

"People want Wi-Fi to do so much more," said Selina Lo, chief executive of Ruckus Wireless. "Small businesses and people at home want it to support things it hadn't in the past."

Alan Cohen, vice president of mobility solutions for **Cisco Systems** Inc., says Wi-Fi has been hurt in the office environment because the open wireless system creates problems for network administrators who are accustomed to having strict control over a network. With a Wi-Fi network, however, there is less transparency and control, he says. Still, he adds, "this is clearly a growing space."

Some advances in software and hardware have recently eased corporate users' Wi-Fi problems. Companies such as **Aruba Networks** Inc., AirTight Networks Inc. and Air Defense Inc. have new products that close security holes and alleviate problems with signal strength. AirTight, Mountain View, Calif., for instance, now makes a wireless

switch that allows a wireless network to operate like a wired network. That lets IT staffers note attempted attacks on the network and see whether unauthorized devices are attempting to connect in.

Last month, Cisco introduced new software and services that secure and extend the office Wi-Fi network to handheld devices. Some of the new services inspect incoming communications traffic for viruses and block unauthorized users from accessing the wireless network.

Adesa Inc., an auction house in Carmel, Ind., began using Wi-Fi in late 2005. But employees often brought in their own wireless equipment, creating rogue connections to the network and allowing unauthorized users to access confidential information. So last year, Chris Roberts, an Adesa network manager purchased new wireless access points with security software from AirTight; he declined to say how much he paid. After installing the equipment, he found about 173 unauthorized people using the company's wireless network. Those people could have been hackers or people downloading music or movies, which could slow down the network. The new equipment allowed Mr. Roberts to block the unapproved users.

Still, such solutions -- which can cost tens of thousands of dollars -- aren't a panacea. Since Wi-Fi operates on a similar radio frequency as other office or household devices, there tends to be more room for disruption, especially from devices that IT staffers may not originally have thought would be a problem.

That's what happened when doctors with Carilion Health Systems, a Roanoke, Va.-based health company with 100 doctor offices and eight hospitals, began using a new wireless endoscopy capsule last year. When swallowed by a patient, the capsule -- a small device about the size of a vitamin tablet -- wirelessly transmits images to a receiver as it passes through a patient's system.

Carilion's doctors were given a demo capsule early last year, but they hadn't met with the hospital's network administrators to inspect the device before they began testing it. Days later, the capsule's high-powered transmitter ended up disrupting the wireless network for the entire clinic and bumped wireless PCs and handheld scanners used by doctors and nurses off the network. Some of the devices that got knocked off the network held vital records about patients' medication dosages.

"It destroyed communication for some of our devices," says Brian Brindle, senior network engineer at Carilion. The capsule was eventually shut off after network administrators stalked the clinic halls with a Wi-Fi meter capable of detecting unauthorized wireless devices.

Wi-Fi in offices may face further bumps, especially with the growth of new technology like online video. Since video traffic is bulkier than traditional text traffic, watching video over a wireless network can slow access speeds to a crawl and bump users off the network. Last year, a new Wi-Fi standard (there are four others), dubbed 802.11n,

debuted and was supposed to solve the problem by improving signal range and download speeds. But upgrading to the new standard, which requires buying and installing new hardware and software, could prove costly for some.

For Mr. Friemann, Prudential, Fox & Roach's problems continued with the firm's wireless network until he approached managers in October and convinced them that a Wi-Fi overhaul was necessary. In January, the company began upgrading its wireless systems, spending $120,000 and tapping Aruba Wireless to help. Aruba put in a secure wireless system with high bandwidth access points that allowed the operators to better monitor who was using the network.

Today, Prudential's Wi-Fi network is more stable and Mr. Friemann's time is no longer consumed by troubleshooting. "It used to be when you walked into one of our offices and wanted wireless you had to find someone that knew what they were doing and if not, good luck, you're on your own," he says. "There's still room for improvement but what we have now is definitely better."

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